



Belarus
**Carbon Finance for
New Projects**
A Primer

February 23, 2007

Abbreviations

AAU	Assigned amount unit
CDCF	Community Development Carbon Fund
CO ₂ e	Carbon dioxide equivalent
DFP	Designated Focal Point
EBRD	European Bank for Reconstruction and Development
EEC	Energy Efficiency Centers
EIT	Economy in Transition
ERPA	Emission Reduction Purchase Agreement
ERU	Emission Reduction Unit
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowances
GHG	Greenhouse gas
GOGC	Georgian Oil and Gas Corporation
GWP	Global Warming Potential
IBRD	International Bank for Reconstruction and Development
IET	International Emissions Trading
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent power producers
JI	Joint Implementation
OECD	Organisation for Economic Co-operation and Development
t CO ₂ e	tonnes Carbon dioxide equivalent
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US\$	United States Dollars
USAID	United States Agency for International Development
VER	Verified Emission Reduction

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About the Brief

1. This brief was prepared by the World Bank with funding provided by the Bank's Carbon Finance Unit.

THE AIM OF THE BRIEF

2. This brief describes and discusses the development of carbon finance projects under the Joint Implementation (JI) with a focus on Belarus's position under the Kyoto Protocol. Annexes to this brief provide support and detail to the main text.

ACKNOWLEDGMENTS

3. The report was prepared by a World Bank team comprising Jane Ebinger and George Anjaparidze, with support from Dmytro Glazkov, Kari Haemekoski, Solvita Klapare, Alexandre Kossoy, Antonio Lim, and Helmut Schreiber. Thematic advisers are Jari Vayrynen and Varadan Atur.

DISCLAIMER

4. This brief is intended as a background document in support of a planned carbon finance workshop targeted a Government officials and potential project developers that will discuss Joint Implementation, the carbon market, and the business aspects of project development.

5. The World Bank is engaged in various aspects of carbon finance in its efforts to help governments address the United Nations Framework Convention on Climate Change and the Kyoto Protocol to that Convention. As part of these efforts, the World Bank uses funds contributed by governments and companies in OECD countries to purchase project-based greenhouse gas emission reductions in developing countries and countries with economies in transition. The World Bank's engagement in carbon finance currently comprises administration of eight funds with contributions from public and private entities of nearly \$1.93 billion (for more details see www.carbonfinance.org).

6. In its role as trustee of these carbon funds, the World Bank may be interested in purchasing Emission Reduction Units (ERUs) for the benefit of providers of such carbon finance, including from those made available from within Belarus. While the World Bank may provide these funds, it in no way seeks to limit Belarus from seeking independent advice on commercial aspects of JI transactions, and Belarus is under no obligation to take into account the interests of the World Bank. In this regard, the assistance provided to Belarus is not intended to confer a special advantage or preference to the World Bank as regards the potential purchase of ERUs by the World Bank, acting as trustee of the participants in the carbon funds entrusted to the International Bank for Reconstruction and Development (IBRD), or in any other capacity. Further, neither Party is restricted in any way from engaging a third party nor parties to pursue independently of the other Party the objectives described in this brief.

Executive Summary

This brief provides an introduction to issues surrounding the development of a carbon project under the Joint Implementation mechanism of the Kyoto Protocol with a particular focus on Belarus. It is intended as background to a broader discussion during a joint workshop on carbon project development. The report was prepared by the World Bank.

OPPORTUNITY FOR BELARUS

The Kyoto Protocol presents a significant opportunity for Belarus to leverage investments in clean energy and the environment. As an ‘industrialized’ country under the Protocol, Belarus has agreed to a quantified greenhouse gas (GHG) emission reduction target¹ during the first commitment period (2008-12) and may participate in the global carbon market under the Joint Implementation (JI) mechanism or through International Emissions Trading (IET) once 75% of parties to the Protocol ratify a proposed amendment to Annex B. This brief discusses opportunities under JI.

Under JI, Belarus may engage in ‘project-based transactions’ which means that, subject to meeting eligibility criteria, GHG emission reductions generated by a project can be sold to other industrialized countries (and companies within these countries) for compliance under the Kyoto Protocol or the EU ETS. At a national level, eligibility criteria include ratification of the Kyoto Protocol and establishment of a Designated Focal Point for climate change; at a project level eligibility criteria include demonstrating that real, long-term, measurable emission reductions take place (so called ‘additionality’ test), applying an approved methodology, and completing project determination.

There are many opportunities for project-based transactions in Belarus given the resource intensive nature of the economy. Common greenhouse gases include carbon dioxide, methane, and nitrous oxide, which can be found in the energy, waste, municipal, and agricultural sectors. Based on a preliminary assessment, the energy, and industry/ chemical sectors, as well as renewable energy, biomass and energy efficiency operations show greater potential in Belarus for generating GHG emission reductions. Select case studies from the World Bank’s portfolio are presented in Annex C.

DEVELOPING A CARBON PROJECT

International regulatory requirements under the Kyoto Protocol have established procedures and documentation. Therefore a project developer should include carbon financing early in the development of a project concept. Preparing a carbon project and negotiating a sale and purchase agreement for emission reductions with carbon buyers typically takes 9-12 months. This timeframe is just to develop the carbon asset

¹ Belarus has agreed to a greenhouse target of 92% of its 1990 baseline emissions for the first commitment period and in addition to use funds gained from JI projects for “further greenhouse gas abatement measures”.

and does not include time to complete design and construction of an underlying investment—for example, a large infrastructure project.

In the global carbon market, the commodity is GHG emission reductions, which must first be generated before they can be sold. Therefore under a typical investment project, a project developer must complete investments and construction before GHG emission reductions are generated. Before annual carbon revenues flow to a project, an internationally accredited third party must confirm ('determination') the quantity of emission reductions generated. Although the sale of emission reductions does not yield up-front revenue, properly designed carbon projects can be used to leverage commercial financing during the construction phase. For example, on a case-by-case basis the World Bank is prepared to advance up to 25 percent of the proposed contract value to the project developer.

A project developer must first complete investments and construction before GHG emission reductions are generated.

THE CARBON MARKET

The carbon market has been a seller's market since early 2005 when the Kyoto Protocol came in to force and the European Union's Emission Trading Scheme started, with the latter dominating. In the first three-quarters of 2006 the carbon market has more than doubled its 2005 value, to an estimated \$21.5 billion. Project-based transactions represented one-quarter of the volume traded and slightly more than one-tenth of global value, with average prices rising at around \$10.50 per tonne in the first three-quarters of 2006.

Prices vary significantly and are negotiated on a case by case basis according to the specific risks inherent in a project, including those linked to the host country and project developer.

The carbon market and pricing may at first appear homogeneous but transactions are based on three main pillars: the volume of emission reductions transacted; the length of the purchasing period; and the price per emission reduction. Projects with similar technologies may carry different risk profiles that are linked to the host country or project developer. Prices therefore vary significantly and are negotiated on a case-by-case basis according to the specific risks inherent in a given project. How these risks are managed and how risks are shared between the seller and buyers have a significant impact on the overall contract value and structure. Some risks are within the control of the project developer or host country.

The global carbon market is focused mainly on purchases to the end of 2012 due to international regulatory regime uncertainties beyond this date. As a result, before considering a carbon project, a project developer should consider and balance the time taken to develop a project against the revenues and other benefits that may ensue. Factors such as a project's additionality, investment financing availability, time to complete construction and therefore the duration of the purchase period for emission reductions (and hence revenues) should be carefully weighed. Intensive

international discussions continue on the possibility of extending and simplifying the Kyoto regime or another climate mitigation program.

THE ROLE OF THE WORLD BANK

The World Bank has been active in the carbon market since 2000, first as a market facilitator and catalyst, and second as a buyer (on behalf of carbon fund participants) of emission reductions from project-based transactions. As trustee of carbon funds with a current value of around \$1.9 billion (comprising public- and private-sector buyers), the Bank is one of the few purchasers of emission reductions beyond 2012.

The Bank has a track record of supporting project developers to generate Kyoto-compliant emission reduction assets, to tap new and additional sources of funds from carbon trade, and help build credibility in the early stages of market entry. Additionally the Bank brings knowledge of carbon finance, and emerging national, regional, and international markets.

SUMMARY

While entering relatively late into the JI market, Belarus still has substantial opportunity to undertake project-based transactions, if it is willing to commit to establishing the domestic framework to support JI projects and to work aggressively to develop a carbon project portfolio while the required 75% of countries ratify the amendment for Belarus to become an Annex B party to the Kyoto Protocol. Given the uncertainties of the market structure beyond 2012, project development may need to be prioritized based on an assessment of the risks and benefits of engaging in the market today.

This brief provides background on the Kyoto Protocol, the global carbon market, and how to access carbon financing. Pricing and risk management are also discussed.

Section 1. The Global Context

This section explains the global context for climate change and Belarus' position relative to the Kyoto Protocol and participation in the carbon market. Belarus' potential to benefit from the JI mechanism depends on how the overall carbon market develops.

THE CHANGING CLIMATE

1. In October 2006, ministers and high-ranking representatives of the global top 20 greenhouse gas-emitting nations met in Monterrey, Mexico to discuss climate change. The "Chair's Conclusions" noted that the basic science is no longer disputed and that there is increasing urgency to address climate change. Economics demonstrate that early action is needed and that the price of delay is substantial. Beyond those costs lie real world risks to economic growth and human health and the possibility of physical catastrophes. The meeting was one of the latest rounds of talks on the climate action plan decided upon at the G8 Gleneagles Summit in 2005.

2. According to climate records, the last several years have been the hottest on record. Precipitation patterns have changed, sea levels have risen, and most non-polar glaciers are retreating.

3. Developing countries will be disproportionately affected by climate change. The Intergovernmental Panel on Climate Change (IPCC) has estimated that a 3.0 degree Celsius increase in global temperatures could lead to a loss of Gross Domestic Product (GDP) in developing countries of 2.0 to 9.0 percent per year, and devastate human health and welfare and fragile ecosystems.

INTERNATIONAL AGREEMENT TO TACKLE CLIMATE CHANGE

4. With the European Union Emissions Trading Scheme, which began on January 1, 2005 and the Kyoto Protocol, which came into force on February 16, 2005, carbon emission reduction targets became international commitments by most industrialized countries. Industrialized countries that have ratified the Protocol are obligated to reduce their greenhouse gas emissions by an average of 5.2 percent compared with 1990 levels during the period 2008-12.²

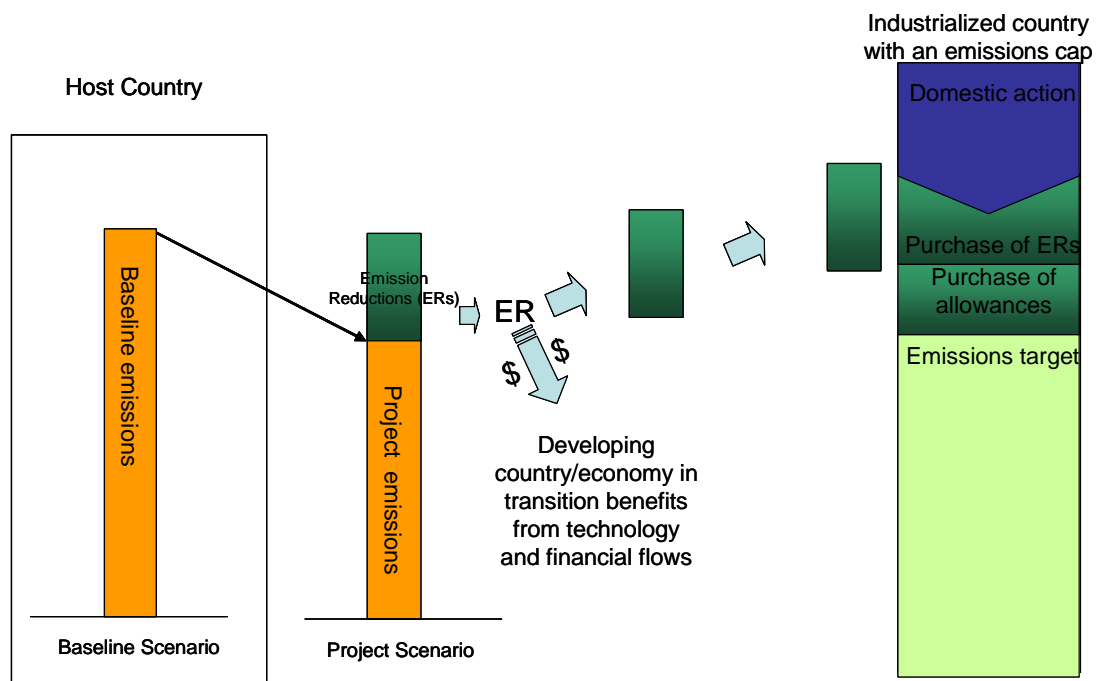
5. Meeting Kyoto targets will require public and private investments. Industrialized countries may achieve these reductions either domestically or through the international market-based mechanisms of the Protocol, including Joint Implementation (JI). JI allows industrialized countries and companies in these countries to supplement their domestic efforts to reduce emissions by purchasing greenhouse gas emission reductions generated by projects in other industrialized countries ("project-based transactions")

² Termed Annex 1 countries under the Kyoto Protocol.

where emissions can be reduced at lower cost, while contributing to sustainable development.³ Carbon finance is the general term applied to resources provided to a project to purchase greenhouse gas emission reductions (“carbon” for short).

6. As an industrialized country⁴ under the terms of the Protocol, Belarus can participate in this market through the Joint Implementation (JI) once the recently adopted amendment to Annex B of the Kyoto Protocol is ratified by 75% of parties. Belarus will take on a greenhouse gas reduction target of 92% of its 1990 emissions for the first commitment period if this amendment is ratified. Belarus has also undertaken to use funds from JI projects for “further greenhouse gas abatement measures”.

Carbon Trading and JI



³ Experience has shown that the cost of reducing one tonne of carbon dioxide (a greenhouse gas) can cost from \$15 to \$100 in some industrialized countries. By contrast there are many opportunities to reduce greenhouse gases in developing countries or economies in transition at a fraction of those costs per tonne of carbon dioxide. Hence an emission reduction that was achieved at a lower cost has a value to a public or private entity in an industrialized country that is required by regulation to reduce its emissions.

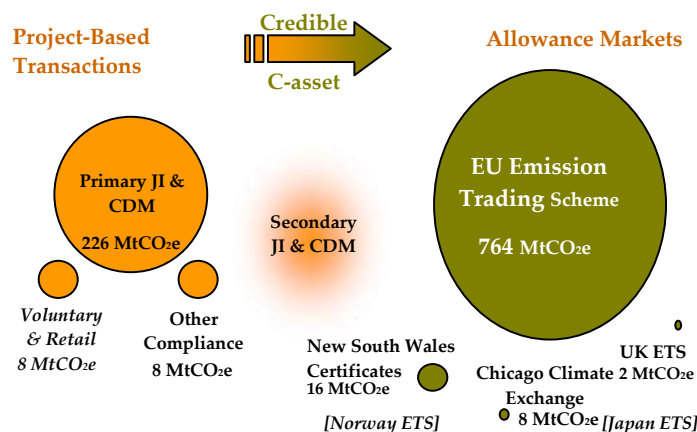
⁴ Termed Annex 1 countries under the Kyoto Protocol.

STATE OF THE CARBON MARKET

7. In the first three-quarters of 2006, the carbon market grew to an estimated \$21.5 billion, more than double the \$10 billion recorded in 2005. Meanwhile volumes transacted also increased to some one billion tonnes of carbon dioxide equivalent during the first three-quarters of the 2006, representing a slower rate of growth than the 700 million tonnes of carbon dioxide equivalent traded in 2005.

8. During 2006, the European Union's Emission Trading Scheme has dominated the market for both volume and value, while project-based transactions over the same period represented one-quarter of the volume (versus roughly half in 2005) and slightly more than one-tenth of global value (versus about 25 percent in 2005). China and India continue to dominate the CDM market with 60 percent and 15 percent of market share respectively.

Structure of the Market 2006



9. Average prices on the project-based market (primarily CDM) rose from about \$7.00 per tonne in 2005 to \$10.50 per tonne in the first three-quarters of 2006.

10. With the current regulatory period ending at 2012—or the first commitment period of the Kyoto Protocol—there is little demand from buyers to purchase beyond 2012. Indeed, the Bank is among the few buyers of emission reductions generated and delivered after 2012.

Section 2. Developing a Carbon Project

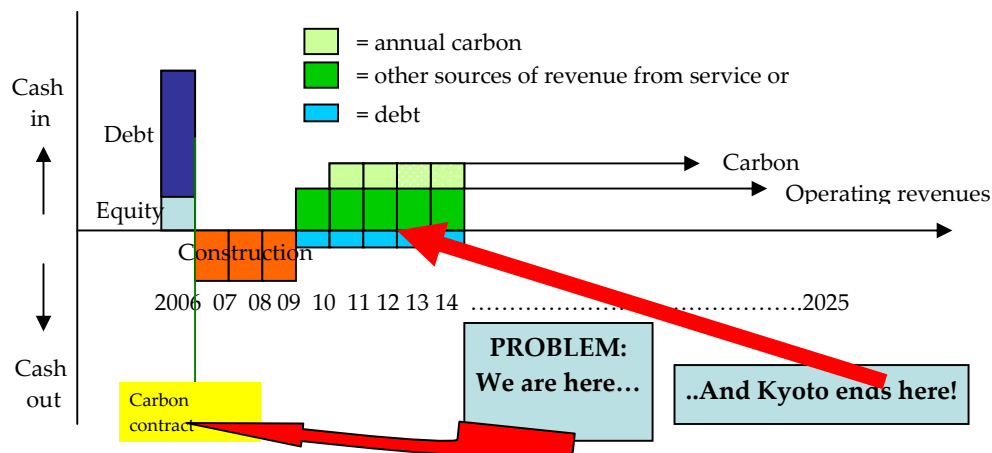
This section provides a brief background to project-based transactions under Joint Implementation Track 2 procedures, including eligibility criteria and an overview of a typical project cycle.

PROJECT-BASED CARBON TRANSACTIONS

11. Carbon transactions are not a grant or loan but a trade based on a commodity model under which buyers purchase emission reductions generated by a project—as they would any other good or service—with most of the forward purchases focused on 2008-12 vintages.

12. Typical payments for emission reductions are made annually on delivery of the reductions. Recent project-based transactions have ranged from 500,000 tCO₂e to about 5.0 million tCO₂e. Bank experience suggests that the minimum worthwhile project size is around 50,000 tCO₂e per year.

The closing window: Kyoto's first commitment period (2008-12)



13. Historically prices have ranged broadly for project-based transactions, depending on the market price signal and buyer willingness to pay. The price has depended on the extent of risk sharing between buyers and sellers in the negotiated emission-reduction purchase agreement—pricing is discussed in later sections of this brief.

14. Carbon transactions do not address the underlying financing needs of a project but experience has shown that future carbon finance cash flows can enhance project viability. Since carbon revenues are typically payable in strong currencies by buyers with high credit ratings, these revenues can be used to increase financier confidence in a

project and to leverage additional capital from financial institutions and others. At one end of the continuum, solid waste projects are extremely attractive because they have quick payback periods due to windfall carbon finance revenues. On the other end, carbon revenues have less impact for renewable energy projects where returns are significantly lower.

**Impact of Carbon Finance on a Project's Internal Rate of Return:
Examples for Renewable Energy and Solid Waste**

Incremental IRR (%) - integrating carbon finance						
RENEWABLE ENERGY						
Price for emission reductions	Purchase period (years)					
	5 (2008 – 20012)	7	10	14	21	
5 USD	0.5	0.6	0.8	1.0	1.2	Impact per MWh 3.16 USD 5.06 USD 6.33 USD
8 USD	0.8	1.1	1.4	1.6	1.9	
10 USD	1.0	1.4	1.7	2.1	2.3	

Incremental IRR (%) - integrating carbon finance						
SOLID WASTE MANAGEMENT						
Price for emission reductions	Purchase period (years)					
	5 (2008 – 20012)	7	10	14	21	
	0.58 tCO ₂ e/ tSW	0.74 tCO ₂ e/ tSW	0.93 tCO ₂ e/ tSW	1.11 tCO ₂ e/ tSW	1.29 tCO ₂ e/ tSW	Impact per MWh 41 USD 66 USD 82 USD
5 USD	17.9	24.1	29.2	31.7	32.8	
8 USD	37.9	45.1	49.2	50.7	51.3	
10 USD	52.3	59.1	62.4	63.5	63.8	

NOTE - tCO₂e/ tSW = tonne CO₂ equivalent emissions per tonne solid waste

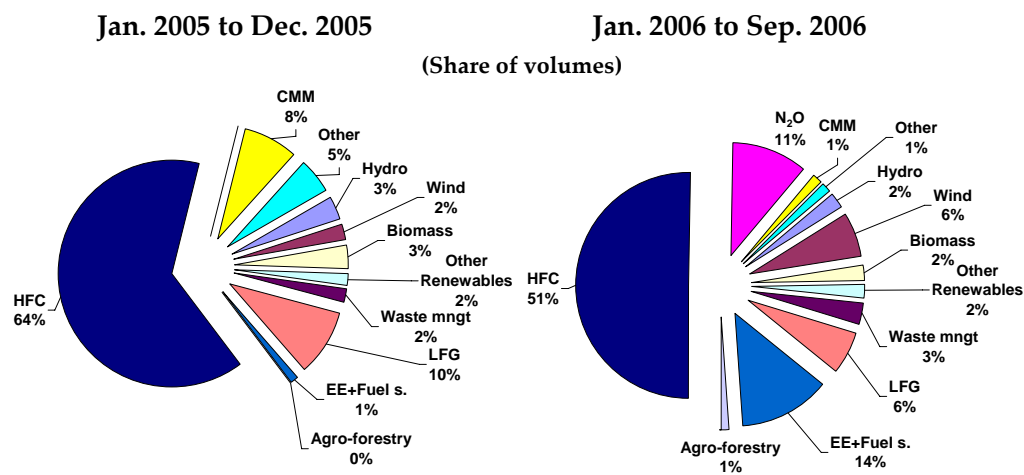
THE MARKET FOR PROJECT-BASED TRANSACTIONS

15. Industrialized countries are expected to purchase emission reductions through investing in projects that reduce emissions of greenhouse gas. Projects are open to participation by public or private sector entities from industrialized and developing countries.

16. The market in project-based transactions has continued to grow. Developing countries supplied 214 million tCO₂e of primary project-based credits in the first three-quarters of 2006 or 21 percent of the total volumes traded for a market value of US\$2.3 billion. China has continued to have a dominant market share of the Clean Development Mechanism with 60 percent. European buyers dominated the primary project-based market with an 86 percent share and the Japanese share of this market reduced to 8.0 percent.

17. Hydrofluorocarbon-(HFC-23) reduction projects accounted for half of market volumes, while renewable energy (especially wind) and energy efficiency projects together accounted for nearly 27 percent of the project-based market. While HFC-23 projects are very attractive, opportunities are limited to a few countries including China and India. Projects involving the destruction of nitrous oxide took an 11 percent market share in the same period. Landfill gas projects reduced to a 6.0 percent share of the market and while coal mine methane has been cited as an attractive asset class the market share was only 1.0 percent in this period. Assets from land use, land-use change, and forestry account for 1.0 percent of volumes transacted.

Market Share— Asset Classes



ELIGIBILITY CRITERIA—PROJECT REQUIREMENTS

18. There are six greenhouse gases covered by the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), per fluorocarbons (PFC), hydro fluorocarbons (HFC), and sulphur hex fluoride (SF₆). These greenhouse gases can be found in the energy, waste, municipal, and agricultural sectors. Each of these greenhouse gases has a different Global Warming Potential (GWP)⁵ measured in tonnes of CO₂ equivalent.

19. For a project to be eligible for carbon finance, GHG emission reductions must be *additional* to any that would occur in the absence of the project activity.

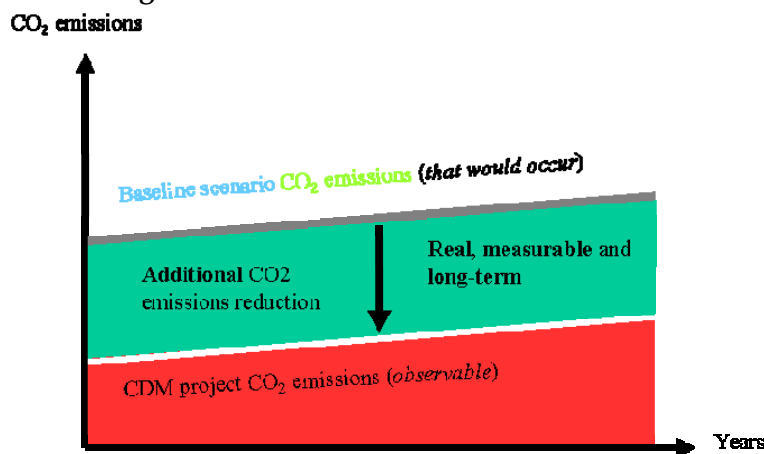
20. To establish additionality the project developer must demonstrate that the project would not have been realized under the most likely (business-as-usual) scenario and that the promise of future carbon revenues assisted in implementing the project.

⁵ GWP of each gas in CO₂ equivalent: CO₂-1; CH₄-21; N₂O-310; HFCs-150 to 11700 (depending on the HFC); PFCs -6500 to 9200 (depending on the PFC); SF₆-23,900.

Emission reductions may be *additional* because the project activity is considered less financially or economically attractive than alternatives to the project (so-called baseline scenario); because there are barriers to investment such as a lack of access to debt financing or international capital markets; and/ or because there are technology barriers including a lack of in-country skills or infrastructure.

21. During project preparation, a baseline study⁶ will investigate the project-based creation of GHG emission reductions and explain how these differ from the project baseline, the most likely course of action and development over time—sometimes referred to as the ‘without-project’ scenario. The baseline is recorded in the Project Design Document.

Establishing the Baseline



Greenhouse gas emissions must be **additional**. A project developer must demonstrate that the project would not have been realized under the most likely (business as usual) scenario and that the promise of future carbon revenues assisted in implementing the project.

22. Unlike CDM, under JI there is more flexibility regarding methodologies for calculation of emission reductions. A developer may propose a new approach, make reference to existing CDM methodologies or use a combination of these two approaches. There is no requirement for a methodology to be separately approved by an international body under JI. Instead, the independent entity/company determining the eligibility of the project under JI will also determine the appropriateness of the methodology used;. However experience to date has shown that two-thirds of JI projects submitted for determination have used an existing CDM methodology to reduce the risk of a JI Supervisory Committee (JISC) review (JISC is an international committee established to oversee the JI mechanism). There are 55 UNFCCC-approved CDM methodologies, a wide range of small-scale methodologies, and several favourably reviewed methodologies. A complete listing of CDM approved methodologies and

⁶ Through the baseline study the number and timing of emission reductions that would be created by the project are calculated. The Project Design Document required for determination includes a Monitoring that defines how project operations will be monitored, how achieved emission reductions are calculated, and how the emission reductions will be independently verified on a periodic basis throughout the project’s operational phase.

progress on methodologies under review can be found on the UNFCCC website.⁷ Additional information on the methodology is provided on the World Bank's methodology website: <http://carbonfinance.org/Router.cfm?Page=Methodology&mt=List>

ELIGIBILITY CRITERIA – REGULATORY REQUIREMENTS

To be eligible to participate in JI transactions, an industrialized country must ratify the Kyoto Protocol and designate a National Focal Point. The Designated Focal Point's (DFP) role is primarily regulatory in nature. A DNA is required to: (a) develop national guidelines and procedures for approving projects under Article 6 of the Kyoto Protocol, and (b) issue written approval for a given JI project.

The GHG emission reductions can be used only for compliance under the Kyoto Protocol, or for trade under the EU ETS, if there is a positive determination of the project by an Accredited Independent Entity. Once GHG emission reductions are generated, and during the life cycle of the project, they must be verified at defined intervals by an accredited independent entity to provide assurance that the project has achieved the stated emission reductions and complies with all JI and project performance criteria. When these criteria are met, an emission reduction unit may be transferred to a buyer's registry. During initial verification a Letter of Approval must be provided for the project by the Buyer's DFP.

Emission reductions can only be used for compliance under the Kyoto Protocol once a project has received a positive determination. A letter of approval from the host country's Designated Focal Point is required during determination and from the Buyer's DFP during initial verification. .

THE PROJECT CYCLE

23. The project cycle for carbon activities is unique due to the nature of the carbon business and the requirements of the Kyoto Protocol.

24. World Bank experience in preparing project-based transactions has shown that between 10 and 12 months are typically required to complete the steps from project concept to negotiation of a sale-purchase contract for emission reductions—an Emission Reduction Purchase Agreement (ERPA). Preparation costs are typically around US\$ 150,000 - 200,000.

25. As a carbon buyer the World Bank will advance preparation costs and provide support to the project developer to process the project through the UNFCCC. Early in project preparation the project developer and the World Bank would finalize a Letter of Intent (LoI), which would typically include an agreement for the project developer to refund project preparation costs up to a specified (capped) amount once carbon revenues start to flow to the developer. The following table summarizes key steps and

⁷ <http://cdm.unfccc.int/methodologies>

responsibilities for project preparation and approval that would be borne by the World Bank, project developer, and host country for a typical project. Annex A provides a fuller description of all terms.

The Carbon Project Cycle

Step	Host country/ Buying Country	Project Developer	World Bank
1		Preparation of Project Idea Note (PIN) – see Annex B	Review and approval of PIN
2	Letter of Endorsement from Host Country – may be required under the national JI procedures.		
3		Letter of Intent is negotiated and signed	
4		Preparation of a Carbon Finance Document (CFD)	Preparation of Project Design Document including a Monitoring Plan
5			
6			Due diligence
7			Determination by Accredited Independent Entity
8	Letter of Approval from Host Country		
9		Emission Reduction Purchase Agreement is negotiated and signed	
10			Project Design Document published on JISC website for 30 day public comment period
11			Determination report, including public comments, published
12			Positive determination after 45 days unless JISC requests review.
13	Letter of Approval from Buying Country.		Initial verification (after construction completed and before commissioning).
14		Periodic (typically annual) monitoring, verification and certification	
15	Annual transfer of emission reductions from the host country registry to the national registry of the purchasing country		Annual payment

Section 3. Belarus' Carbon Potential

This section provides a brief overview of sectors with carbon potential using the UNFCCC's listed approved methodologies as a basis for screening sectors.

26. Since today's carbon market focuses on sales of GHG emission reductions generated up to the end of 2012, two important selection criteria for carbon project development are the potential for generating GHG emission reductions and a project's capacity to mobilize needed capital investment, and completed (or underway) feasibility studies.

27. While not required under JI rules many developers today are using existing CDM approved methodologies as a basis for project development. Since developing new methodologies can be time consuming and intensive one other criteria for screening might be the availability of existing UNFCCC-approved methodologies or methodologies-under-development.

28. The following table provides a snapshot of Belarus' potential for generating GHG emission reductions, based on a review of available national information, and an overview of the availability of existing CDM methodologies, i.e., those that have been approved or that have a rating of 'B' or higher for these sectors and industries. Information on CDM methodologies can be found on the UNFCCC website⁸ and is also provided on the World Bank's methodology website:

<http://carbonfinance.org/Router.cfm?Page=Methodology&mt=List>.

⁸ <http://unfccc.int/2860.php>

Preliminary Overview of Carbon Potential in Belarus

Sector/ Industry	GHG Emission Reduction Potential	Availability of Existing Methodologies	Remarks
Chemical industry	High	High	Short processing time, low risk, high return
Energy production	High	Medium	Moderate processing time and risk, high return
Energy transmission	High	Low	Long processing time, risky, high return
Agriculture	Medium	High	Short processing time, low risk, moderate returns
Renewable energy	Medium	Medium	Moderate processing time, returns and risk
Waste management	Medium	High	Short processing time, low risk, high return
Water supply	Medium	Medium	Moderate processing time, returns and risk
Energy efficiency (all sectors)	Medium	Medium	Moderate processing time, returns and risk
Other industry	Unknown	Medium	Moderate processing time and risk, unknown returns
Transport	Unknown	Low	Long processing time and high risk, unknown returns

29. Based on this preliminary assessment, the energy, oil and gas, chemical and cement sectors show greater potential for generating GHG emission reductions and have existing methodologies. Sample project ideas are outlined below and case studies are presented in C. However, experience in other countries has shown that projects in energy, oil and gas sectors often have greater challenges in meeting additionality criteria compared to projects in agriculture or waste management. Therefore it would be important to have a fair balance in reaching out to potential project developers from a range of sectors.

Typical Carbon Projects

Power	<ul style="list-style-type: none"> - rehabilitate, modernize and increase efficiency in power generation; - use cleaner fuels such as natural gas; - promote energy conservation; - improve efficiency and decrease losses in transmission and distribution; - increase the share of renewable technologies, e.g., hydro, wind and photovoltaic power ; - promote demand-side management measures.
Oil extraction, production and refining	<ul style="list-style-type: none"> - introduce more efficient technologies; - minimize emissions, e.g., reduce flaring of associated gas; - promote energy conservation.
Mining	<ul style="list-style-type: none"> - reduce methane emissions, e.g., coal bed methane/coal mine methane capture; - introduce more efficient technologies and promote energy conservation.
Gas production, storage, transportation and distribution	<ul style="list-style-type: none"> - minimize emissions, e.g., losses from corroded pipelines, leaks at compressor stations; - decrease losses in transmission and distribution; - improve efficiency; - promote energy conservation; - promote demand-side management measures.
Municipal Services	<ul style="list-style-type: none"> - improve efficiency of heating systems; - improve waste management; - reduce or capture methane from landfills and wastewater; - improve efficiency of water supply; - promote energy conservation in the provision of municipal services; - promote energy savings in the residential sector.
Industry	<ul style="list-style-type: none"> - improve efficiency in the chemical, petrochemical, metallurgical and cement industries, e.g., system integration, waste heat/gas/pressure recovery and utilization.; - promote energy conservation.

Section 4. How Carbon Prices are Determined

This section provides an overview of factors that affect the risk of a project-based transaction, their influence on price, and the World Bank's role in the market.

TRANSACTIONS AND THE CARBON MARKET

30. Until the carbon market matures, market imperfections will pervade. The carbon market and pricing may appear homogeneous but transactions are few (though increasing) and usually private, so reliable information is limited on the structure and terms of specific transactions and their underlying projects.

31. Historical prices for emission reductions have ranged broadly from cents per tCO₂e in early deals in the voluntary market, to US\$10 per tCO₂e and higher in some cases. With both the EU ETS, which began on January 1, 2005, and the Kyoto Protocol, which came into force on February 16, 2005, carbon emission reductions became international commitments by most industrialized countries thus driving up the demand for quality emission reductions. Since then the carbon market has shifted from a buyer's to a seller's market.

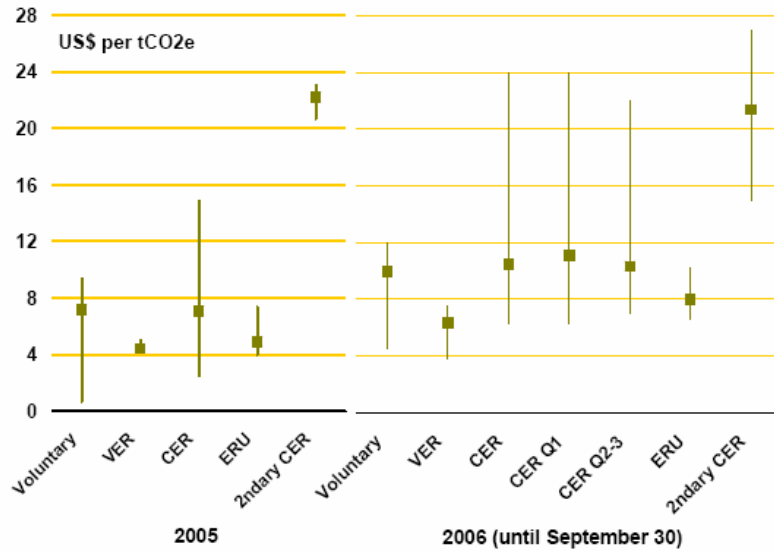
32. Prices have continued to rise across the board in every segment of the project-based carbon market⁹, with weighted average prices for CERs at about US\$10.50 per tCO₂e (up from US\$7.10 per tCO₂e in 2005), representing a rise in year-to-year average prices of almost 50 percent. ERUs have been priced slightly lower, mainly due to the still somewhat higher regulatory uncertainty of JI compared to the CDM.

33. The following figure shows the observed range and average prices for emission reductions. The average price for each asset is illustrated in the figure below by a green square and the range is illustrated by a green line. The continued price fluctuations of European Union Allowances (EUAs), CERs and ERUs confirms a link between the prices for these commodities.

34. The average prices mask a range that varies based on risk factors related to the project, the eligibility of these emission reductions under the Kyoto Protocol, and the EU ETS and the specific terms of the sale and purchase contracts, otherwise referred to as Emission Reduction Purchase Agreements (ERPAs). The ERPA's are based on three main pillars: the volume of emission reductions transacted; the length of the purchasing period; and the price per emission reduction. The structure of the ERPA (i.e., including the risk allocation, terms and conditions) has a large impact on the resulting price to be agreed for the Emission Reductions. Additionally, projects with similar technologies may carry different risk profiles that are linked to the host country or project developer.

⁹ According to the joint IETA and World Bank report, *State and Trends of the Carbon Market 2006*

Prices for Project-based Transactions in 2005 and 2006 (to September 30, 2006)



Legend: VER – Verified Emission Reduction ; CER – Certified Emission Reduction ; ERU – Emission Reduction Unit .

Note: Only CERs and VERs are relevant to the JI market.

Source: http://carbonfinance.org/docs/StateandTrendsMarketUpdateJan1_Sept30_2006.pdf (p. 9)

35. Prices therefore vary significantly and are negotiated on a case-by-case basis according to the specific risks inherent in a given project. How these risks are managed and how risks are shared between the seller and buyers have a significant impact on the overall contract value and structure. Some of these risks are within the control of the project developer or host country. Risk factors affecting prices for emission reductions are shown below. See also Annex D.

Sources of Risk for Carbon Projects

Activity	Risk and impact on price
Implementing the project	The likelihood that a project will be constructed on time, that it will remain fully operational for the entire contract period, or that there is potential for a delay with issuing licenses, permits or the letters of approval from the DFP will affect risk perception and hence price for emission reductions generated by the project.
The buyer funds project preparation costs and expenses	The preparation costs can be refunded from the carbon revenues OR the project developer may wish to accept a discounted price for the emission reductions.
The buyer provides an advance to support project implementation	The buyer assumes risks for project development and credit, including project non-completion and non-generation or insufficient generation of emission reductions, and guarantor creditworthiness for the advance.
The project developer guarantees to deliver the contract	This will typically increase the price paid for ERUs by between 10 and 30 percent, reflecting the high risks and liabilities borne by the developer.
Receiving a positive determination	Emission Reduction Units—eligible for international trade—require that a project has (i) a positive determination, (ii) letters of approval issued by the host country's Designated Focal Point and that of the purchasing country. A country without a DFP or a track record of approving projects is generally seen as high risk.
Verifying the emission reductions	Once a project starts generating emission reductions, and prior to payment the emission reductions must be verified by an accredited independent entity. This could result in delays regarding the issue of Emission Reduction Units, their delivery to the buyer and could potentially reduce the overall volume of ERUs generated by the project. ERUs are issued by the host country, and the perceived risk of transparency and reliability of this process may affect buyers' willingness to engage in transactions, as well as the price paid.
The contract is structured to reduce the risk of non delivery	A price increase is generally applied for emission reductions where the contract includes sweeping clauses, over-colateralization and other financial covenants.
Emission reductions are purchased beyond the end of 2012	A price discount is generally applied since the buyer takes the risk that there will not be a second commitment period of the Kyoto Protocol or that these emission reductions cannot be converted to ERUs.

THE WORLD BANK IN THE CARBON MARKET

36. The World Bank's involvement in the carbon market predates by several years the entry into force of the Kyoto Protocol and the EU ETS. The Bank was *the* forerunner in the carbon market before it was fully established and when few other buyers existed. The Bank and participants in the Prototype Carbon Fund, its first carbon fund, accepted the risk that the emission reductions fund they purchased would be certified as Kyoto-compliant, and that there would be a Protocol in force. The prices paid at that time reflected the uncertainty and risk in the pre-Kyoto time-frame.

37. Recently the Bank's role has shifted from a market maker (price setter) to a fast market follower. The Bank's pricing strategy is to purchase emission reductions at market prices while weighing transaction risks and contract structure.

The role of the World Bank in recent years has shifted from a market maker (price setter) to a fast market follower.

38. ***The World Bank approach to price.*** The World Bank has developed an approach to establish transparent and consistent market prices for carbon projects in its pipeline based on market prices and risks. The Bank uses a pricing committee, dialogue with its Carbon Fund Participants and host countries, and market research (e.g., the annual State of the Carbon Market report) This approach is expected to achieve three objectives.

- Offer project developers a fair market price for their emission reductions;
- Improve carbon market transparency by assisting in building, sustaining, and expanding the international market; and
- Pursue the Bank objective of fully committing resources placed in its trust by Carbon Fund Participants.

39. Under this strategy prices are determined by weighing allocation of risks assumed by the World Bank and the project developer. In the absence of a well-informed market, the World Bank proposes to develop a proxy for "market" price for each transaction by pricing off a benchmark (or reference price) adjusted for risk.

40. This "benchmark" transaction is defined as a transaction for which the global carbon market has relatively complete information on key price determinants. The price benchmarks and spreads are reviewed periodically.

41. ***Post-Kyoto World Bank purchases.*** The market for GHG emission reductions is focused on end-2012 but the World Bank is among a few purchasers of emission reductions beyond 2012. In some cases and on a project-by-project basis, the World Bank is willing to purchase emission reductions through end-2015. If a single-price contract is selected, the price per emission reduction may be lower than in a contract that covers the period until 2012 only, but the total contracted value of the emission reductions until 2015 is often comparable or greater. Some project developers prefer the certainty of a guaranteed revenue stream from the emission reductions.

42. *World Bank purchase of ERUs and VERs* The World Bank buys either Emission Reduction Units (ERUs) or Verified Emission Reductions (VERs) using the same pricing approach—offering coherent market prices that ensure equitable benefit sharing between buyers and sellers. Additionally, the process must be transparent to ensure credibility from the host countries’ perspective and to promote durability of the Emission Reduction Purchase Agreements (ERPA) contracts.

43. *Creating a track record and generating value.* The World Bank is a leading centre of expertise on JI project development and emission reductions purchases with a track record of bringing projects to market and creating a valuable tradable asset. Countries and project developers with little experience in JI projects have turned to the World Bank for help. In addition to expertise, the World Bank partnership provides reassurance to potential buyers.

44. To participate in emissions trading, project developers need to create tradable assets—Emission Reduction Units (ERUs), but prior to that, a national and international regulatory approval process must be completed. The World Bank can offer expertise and support on the entire process of JI project development in projects where the World Bank will purchase some of the generated emission reductions.

45. The World Bank can agree to purchase up to 80 percent of the generated emission reductions, but it can also agree to purchase as little as 20-30 percent. The project developer and the World Bank negotiate the percentage.

46. Some project developers are interested in securing a contract from the World Bank for maximum volume to minimize exposure to price fluctuations; one large contract may help mobilize upfront financing for the project.

47. Project developers interested in contracting small fractions of the total volume of emission reductions (e.g., 20-30 percent) with the World Bank may be speculating that future prices will increase or that they can negotiate more favourable terms.¹⁰ This small-fraction option is usually relevant only for projects with potential to generate large quantities of emission reductions.¹¹

¹⁰ Project developers might want to market non committed emission reductions outside of the World Bank. In projects that comply with the World Bank safeguard policies, the World Bank may help the project to market these emission reductions, e.g. an auction of emission reductions. The auction can be set up in a way that will set a minimum floor price but then enable credible buyers to bid for the emission reductions.

¹¹ Anecdotal evidence suggests that other buyers are inclined to bid for emission reductions where the World Bank is supporting project development. There are two main reasons: (i) World Bank experience and commitment in bringing projects to market reduces risk that the project will fail to complete the cumbersome international process or manage other risks; (ii) World Bank environmental and social safeguards apply to the projects so the purchaser is assured of reduced risk of future scrutiny of the emissions reductions.

Annex A. The World Bank's Carbon Project Cycle

Key steps in the preparation cycle for a carbon project at the World Bank

1. **Project Idea Note (PIN)** Project developers¹² prepare the PIN (including a brief financial analysis), laying out the basics of the project design and emission reduction impact. The World Bank PIN Review Committee PIN reviews and approves; subject to internal “no-objection,” the project is included in the pipeline for the relevant carbon fund. The review process can take 2- 4 weeks.
2. **Letter of Endorsement** - If the PIN was submitted by a third-party project developer, and the World Bank decides to develop it further, the host country (e.g., the Designated Focal Point) will be notified of the project. The project developer typically asks the host country for a letter of endorsement/ no objection for the project where this is required under national approval procedures (some buyers may also request such a letter to better assess the risks of the project), to ensure that the host country approves of the project and understands its follow-up responsibilities under the Kyoto Protocol. The project developer makes the application and is supported by World Bank if needed.
3. **Letter of Intent (LoI)** - A LoI between the project developer and the World Bank will be negotiated and signed. Through this LoI the World Bank formally signals its intention to purchase emission reductions generated by a specific project under agreed terms in return for the exclusive right to contract for the purchase of emission reductions. By signing this letter the project developer commits to repay project preparation costs if it decides not to proceed to negotiate an Emission Reductions Purchase Agreement with the Bank in relation to the project. Preparation and supervision costs (reimbursable to the World Bank from carbon payments) are specified and capped in the Letter of Intent.
4. **Carbon Finance Document (CFD)** The project developer prepares a CFD, essentially an elaborated version of the PIN that provides additional detail on financing and risk analysis—sufficient project information to allow the World Bank Fund Management Committee (and the Participants Committee, if required) to review and clear the project and its further development. The CFD also notes areas that need further study after clearance. The CFD is approved in a review meeting in line with the requirements of the relevant Carbon Fund Instrument.
5. **Project Design Document (PDD) including a Monitoring Plan (MP)** - Completion of the PDD including a MP are required under the Kyoto Protocol and there is a specific format defined by the JI Supervisory Committee (JISC) for track 2 projects. The World Bank typically contracts consultants to prepare the PDD and covers

¹² Either a Host country representative or a third-party project sponsor can submit a PIN.

preparation costs, but the Bank will later recover some or all costs from the emission reduction payments. Steps 4 and 5 can overlap.

6. **Due Diligence.** Subject to CFD approval (step 4), World Bank financial, technical, environmental, and social due diligence is carried out.
7. **Determination Report.** An international auditing company will carry out an independent validation (or determination report) of the project design (PDD including MP) to confirm that the emission reductions are additional to the baseline, the monitoring plan is sufficient, and that the emission reductions have a high probability of being certified under the Kyoto Protocol. Validation usually takes about 6-10 weeks. The World Bank will contract the accredited independent entity and fund the validation, but will later recover some or all the costs from the emission reduction payments.
8. **Letter of Approval (LoA).** The developer will apply to the host country for a Letter of Approval, which signals formal approval for the project for the purposes of Article 6 or 12 of the Kyoto Protocol, and confirms that the project assists the host country in achieving sustainable development. A Letter of Approval is required for all JI activities under the Protocol and is a prerequisite for signing an ERPA with the World Bank. The project developer makes the application and is supported by the World Bank if needed.
9. **Emission Reduction Purchase Agreement (ERPA¹³).** The World Bank drafts an ERPA for discussion with project developer representatives. During negotiations, the final terms of the ERPA are agreed between the World Bank and the project developer. The ERPA also lays down detailed requirements, obligations, and procedures for emission reduction generation, verification, and delivery.
10. **Determination.** The PDD is made public through the JISC website for a 30 day period for public comment. After this is completed the Determination report, reflecting any comments received, is published for a 45 day period. If JISC does not request a separate review with this 45 day timeline a positive determination is given for the project.
11. **Initial Verification.** After the project is constructed and before it is commissioned to produce emission reductions, the World Bank contracts an accredited independent entity (a “verifier”) for the project (different from “validator”). The verifier will establish contact with the project developer and undertake an initial verification,

¹³ An ERPA typically stipulates: (i) tonnes to be traded and price on delivery; (ii) money up front (if any); (iii) consequences if verifiable emission reductions are not delivered; (iv) recovery of preparation and supervision costs incurred by the World Bank; (v) Conditions of effectiveness, e.g. host country approval, financial closure, etc; and (vi) the exclusive right of Certification and Verification of purchased emission reductions.

which should confirm that the project is ready to generate verifiable and certifiable emission reductions. There is a 15 day period following issue of the verification report during which JISC can request a separate review. A letter of approval from the purchasing country is required at this point. This will trigger the World Bank acceptance of emission reductions from the project.

12. **Monitoring, Verification, and Certification.** As part of project implementation, the project developer must implement the monitoring plan, which provides a methodology and a tool for measuring and calculating the emission reductions generated by the project. Once the project starts to generate emission reductions, the project developer monitors the project in accordance with this plan. Verification of the emission reductions will be undertaken periodically in accordance with the monitoring plan and other applicable guidelines by an accredited independent entity (the verifier), who is contracted for the project by the World Bank. The verifier will issue a certificate, which will confirm that the emission reductions have been achieved in the verification period in compliance with applicable JI rules.
13. **Payment.** Once the emission reductions are certified, the World Bank will pay for the amount of emission reductions as agreed in the ERPA and the emission reductions are transferred to the World Bank's Carbon Fund Participants in accordance with the ERPA and applicable UNFCCC or other rules. Payments for the emission reductions are typically made on annual basis after their independent verification at the beginning of each calendar year following delivery of the emission reductions (e.g., 2008 ERs are paid for in early 2009). Finally, emission reductions are transferred between the national registry of the host country and the national registry of purchasing country.

Annex B. Project Idea Note (PIN) - Template

Name of Project: _____

Date submitted: _____

Description of size and quality expected of a PIN

Basically a PIN will consist of approximately 5-10 pages providing indicative information on:

- the type and size of the project
- its location
- the anticipated total amount of greenhouse gas (GHG) reduction compared to the “business-as-usual” scenario (which will be elaborated in the baseline later on at Project Design Document (PDD) level)
- the suggested crediting life time
- the suggested Certified Emission Reductions (CERs)/Emission Reduction Units (ERUs)/Verified Emission Reduction (VERs) price in US\$ or € /tonne CO_{2e} reduced
- the financial structuring (indicating which parties are expected to provide the project’s financing)
- the project’s other socio-economic or environmental effects/benefits

While every effort should be made to provide as complete and extensive information as possible, it is recognised that full information on every item listed in the template will not be available at all times for every project.

NOTE: For forestry projects, please use the PIN Template for LULUCF projects available at www.carbonfinance.org.

A. PROJECT DESCRIPTION, TYPE, LOCATION AND SCHEDULE

OBJECTIVE OF THE PROJECT <i>Describe in not more than 5 lines</i>	
PROJECT DESCRIPTION AND PROPOSED ACTIVITIES <i>About ½ page</i>	

TECHNOLOGY TO BE EMPLOYED¹⁴ <i>Describe in not more than 5 lines</i>	
TYPE OF PROJECT	
Greenhouse gases targeted CO ₂ /CH ₄ /N ₂ O/HFCs/PFCs/SF ₆ <i>(mention what is applicable)</i>	
Type of activities Abatement/CO ₂ sequestration	
Field of activities <i>(mention what is applicable)</i> <i>See attachment 1 for examples</i>	
LOCATION OF THE PROJECT	
Country	
City	
Brief description of the location of the project <i>No more than 3-5 lines</i>	
PROJECT PARTICIPANT	
Name of the Project Participant	
Role of the Project Participant	<ul style="list-style-type: none"> a. Project Operator b. Owner of the site or project c. Owner of the emission reductions d. Seller of the emission reductions e. Project advisor/consultant f. Project investor g. Other, please specify: _____
Organizational category	<ul style="list-style-type: none"> a. Government b. Government agency c. Municipality d. Private company e. Non Governmental Organization f. Other, please specify: _____
Contact person	
Address	
Telephone/Fax	
E-mail and web address, if any	

¹⁴ Please note that support can only be provided to projects that employ commercially available technology. It would be useful to provide a few examples of where the proposed technology has been employed.

Main activities <i>Describe in not more than 5 lines</i>	
Summary of the financials <i>Summarize the financials (total assets, revenues, profit, etc.) in not more than 5 lines</i>	
Summary of the relevant experience of the Project Participant <i>Describe in not more than 5 lines</i>	
PROJECT PARTICIPANT	
Name of the Project Participant	
Role of the Project Participant	<ul style="list-style-type: none"> a. Project Operator b. Owner of the site or project c. Owner of the emission reductions d. Seller of the emission reductions e. Project advisor/consultant f. Project investor g. Other, please specify: _____
Organizational category	<ul style="list-style-type: none"> a. Government b. Government agency c. Municipality d. Private company e. Non Governmental Organization f. Other, please specify: _____
Contact person	
Address	
Telephone/Fax	
E-mail and web address, if any	
Main activities <i>Describe in not more than 5 lines</i>	
Summary of the financials <i>Summarize the financials (total assets, revenues, profit, etc.) in not more than 5 lines</i>	
Summary of the relevant experience of the Project Participant <i>Describe in not more than 5 lines</i>	
<i>Please insert information for additional Project Participants as necessary.</i>	
EXPECTED SCHEDULE	

<p>Earliest project start date <i>Year in which the plant/project activity will be operational</i></p>	
<p>Estimate of time required before becoming operational after approval of the PIN</p>	<p>Time required for financial commitments: __ months Time required for legal matters: __ months Time required for construction: __ months</p>
<p>Expected first year of CER/ERU/VERs delivery</p>	
<p>Project lifetime <i>Number of years</i></p>	
<p>For CDMJI projects: Expected Crediting Period <i>7 years twice renewable or 10 years fixed</i></p> <p>For JI projects: Period within which ERUs are to be earned (<i>up to and including 2012</i>)</p>	
<p>Current status or phase of the project <i>Identification and pre-selection phase/opportunity study finished/pre-feasibility study finished/feasibility study finished/negotiations phase/contracting phase etc. (mention what is applicable and indicate the documentation)</i></p>	
<p>Current status of acceptance of the Host country <i>Letter of No Objection/Endorsement is available; Letter of No Objection/Endorsement is under discussion or available; Letter of Approval is under discussion or available (mention what is applicable)</i></p>	
<p>The position of the Host</p>	<p>Has the Host country ratified/acceded to the Kyoto</p>

country with regard to the Kyoto Protocol	Protocol? <p style="text-align: center;">_____ NO / YES, YEAR _____</p> Has the Host country established a CDM Designated National Authority / JI Designated Focal Point? <p style="text-align: center;">_____ NO / YES, YEAR _____</p>
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B. METHODOLOGY AND ADDITIONALITY

ESTIMATE OF GREENHOUSE GASES ABATED/ CO₂ SEQUESTERED <i>In metric tonnes of CO₂-equivalent, please attach calculations</i>	Annual (if varies annually, provide schedule): ___ tCO ₂ -equivalent Up to and including 2012: ___ tCO ₂ -equivalent Up to a period of 10 years: ___ tCO ₂ -equivalent Up to a period of 7 years: ___ tCO ₂ -equivalent
BASELINE SCENARIO CDM/JI projects must result in GHG emissions being lower than “business-as-usual” in the Host country . At the PIN stage questions to be answered are at least: <ul style="list-style-type: none"> • Which emissions are being reduced by the proposed CDM/JI project? • What would the future look like without the proposed CDM/JI project? <i>About ¼ - ½ page</i>	
ADDITIONALITY Please explain which additionality arguments apply to the project: (i) there is no regulation or incentive scheme in place covering the project (ii) the project is financially weak or not the least cost	

<p>option (iii) country risk, new technology for country, other barriers (iv) other</p>	
<p>SECTOR BACKGROUND Please describe the laws, regulations, policies and strategies of the Host country that are of central relevance to the proposed project, as well as any other major trends in the relevant sector.</p> <p>Please in particular explain if the project is running under a public incentive scheme (e.g. preferential tariffs, grants, Official Development Assistance) or is required by law. If the project is already in operation, please describe if CDM/JI revenues were considered in project planning.</p>	
<p>METHODOLOGY Please choose from the following options:</p> <p>For CDM projects: (i) project is covered by an existing Approved CDM Methodology or Approved CDM Small-Scale Methodology (ii) project needs a new methodology (iii) projects needs modification of existing Approved CDM Methodology</p> <p>For JI projects: (iv) project will use a baseline and monitoring plan in</p>	

accordance with Appendix B of the JI Guidelines and further JISC guidance (V) project will use Approved CDM or CDM Small-Scale Methodology	
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C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)	
Development costs	___ US\$ million (Feasibility studies, resource studies, etc.)
Installed costs	___ US\$ million (Property plant, equipment, etc.)
Land	___ US\$ million
Other costs (please specify)	___ US\$ million (Legal, consulting, etc.)
Total project costs	___ US\$ million
SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED	
Equity Name of the organizations, status of financing agreements and finance (in US\$ million)	
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US\$ million)	
Debt – Short term Name of the organizations, status of financing agreements and finance (in US\$ million)	
Carbon finance advance payments ¹⁵ sought from the World Bank carbon funds. (US\$ million and a brief clarification, not more than 5 lines)	
SOURCES OF CARBON FINANCE Name of carbon financiers other than any of the World Bank carbon funds that your	

¹⁵ Advance payment subject to appropriate guarantees may be considered.

are contacting (if any)	
INDICATIVE CER/ERU/VER PRICE PER tCO₂e¹⁶ <i>Price is subject to negotiation. Please indicate VER or CER preference if known.¹⁷</i>	
TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE	
A period until 2012 (end of the first commitment period)	___ US\$ / €
A period of 10 years	___ US\$ / €
A period of 7 years	___ US\$ / €
<p>Please provide a financial analysis for the proposed CDM/JI activity, including the forecast financial internal rate of return for the project with and without the Emission Reduction revenues. Provide the financial rate of return at the Emission Reduction price indicated in section “Indicative CER/ERU/VER Price”. DO NOT assume any up-front payment from the Carbon Finance Unit at the World Bank in the financial analysis that includes World Bank carbon revenue stream.</p> <p>Provide a spreadsheet to support these calculations. The PIN Financial Analysis Model available at www.carbonfinance.org is recommended.</p>	

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	
GLOBAL BENEFITS Describe if other global benefits than greenhouse gas emission reductions can be attributed to the project.	
SOCIO-ECONOMIC ASPECTS	

¹⁶ Please also use this figure as the carbon price in the PIN Financial Analysis Model (cell C94).

¹⁷ The World Bank Carbon Finance Unit encourages the seller to make an informed decision based on sufficient

understanding of the relative risks and price trade-offs of selling VERs vs. CERs. In VER contracts, buyers assume all carbon-specific risks described above, and payment is made once the ERs are verified by the UN-accredited verifier. In CER/ERU contracts, the seller usually assumes a larger component - if not all – of the carbon risks. In such contracts, payment is typically being made upon delivery of the CER/ERU. For more information about Pricing and Risk, see [“Risk and Pricing in CDM/JI Market, and Implications on Bank Pricing Guidelines for Emission Reductions”](#).

<p>What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project? Indicate the communities and the number of people that will benefit from this project. <i>About ¼ page</i></p>	
<p>What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? <i>About ¼ page</i></p>	
<p>What are the possible other effects (e.g. training/education associated with the introduction of new processes, technologies and products and/or the effects of a project on other industries)? <i>About ¼ page</i></p>	
<p>ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST COUNTRY A brief description of the project's consistency with the environmental strategy and priorities of the Host country <i>About ¼ page</i></p>	

ATTACHMENT 1 - Technologies

1. Renewables
 - 1a. Biomass
 - 1b. Biogas
 - 1c. Bagasse
 - 1d. Wind
 - 1e. Hydro
 - 1f. Geothermal
 - 1g. Photovoltaic
 - 1h. Solar Thermal
2. Fossil Fuel Switch
3. Energy Efficiency
 - 3a. Cement Efficiency Improvement
 - 3b. Construction material
 - 3c. District heating
 - 3d. Steel Gas Recovery
 - 3e. Other Energy Efficiency
4. Waste Management
 - 4a. Landfill Gas recovery/utilization
 - 4b. Composting
 - 4c. Recycling
 - 4d. Biodigester
 - 4e. Wastewater Management
5. Coalmine/Coalbed Methane
6. Oil and Gas Sector
 - 6a. Flared Gas Reduction
 - 6b. Reduction of technical losses in distribution system
7. N₂O removal
8. HFC23 Destruction
9. SF₆ Recovery
10. Transportation
 - 9a. Fuel switch
 - 9b. Modal switch
11. Others

Annex C. Selected World Bank Case Studies

This Annex presents case studies from carbon projects under stages of development in World Bank carbon project portfolio.

ALBANIA - ASSISTED NATURAL REGENERATION PROJECT (World Bank-Bio Carbon Fund)

The Assisted Natural Regeneration project aims to reforest highly degraded land and develop a multi-functional broadleaf and mixed broadleaf high forest of native species. It includes the following activities: (a) protection of areas for natural regeneration or re-growth by fencing; (b) supplemental planting of 200-500 seedlings per ha to enrich species diversity and to stabilize highly eroded areas; and (c) basic silvicultural works (vegetative cutting to promote growth such as coppicing, cleaning and thinning).



The project covers about 5,729 ha spread over 24 communes and five regions, and use the following species mix: two-thirds broadleaf and coniferous natives (oak, chestnut, maple, birch, walnut, pines) and one-third Robinia (from local seeds and planted with other species). The areas included in the project are all communal forest lands which usufruct rights are transferred to the communes.

This project is an integrated part of the Natural Resource Development Project (NRDP), of which the objective is to establish or maintain sustainable, community-based natural resource management practices in hilly and mountainous lands that are prone to erosion and resource degradation. The preparation of the project greatly benefited from the experiences and knowledge acquired from the implementation of the first Albania Forestry Project.

The assisted natural regeneration fits the afforestation/reforestation definition of the Marrakesh Accords and the additionality criterion since a deliberate effort is necessary to induce natural regeneration, prevented currently by the excessive grazing of goats. The activities included in the project are expected to sequester around 0.14 Mt CO₂e by 2012 and around 0.26 Mt CO₂e by 2017.

In addition to the global environmental benefits from the sequestration of CO₂, the reforestation will help the local environment by halting the ongoing degradation of

forest lands, loss of vegetative cover and soil erosion, and will also positively impact adjoining areas. It will result in improved water quality, watershed capacity and lessening of siltation of watercourses and reservoirs. Once established the forests will provide much needed and valuable habitat for a wide range of native flora and fauna, and enrich and add to the natural biodiversity.

At the social level, the people will benefit from this project through direct revenues from carbon sales, short and medium term employment, reduction of maintenance costs on irrigation and drainage infrastructure, reduction of the cost of water treatment, and reduction of flood risk. The developed forest will further serve as a sustainable source of firewood, poles, timber, fruits, fodder and other products for the local communities who currently have usufruct rights.

The project is implemented and financed by the Government of Albania, through the Ministry of Environment, Forests and Water Administration. Project preparation was supported by a Japanese PHRD Grant, and by direct contribution of beneficiaries.

This pilot project was the very first CDM project proposal in Albania and through the process of preparing this project all parties involved, went through a learning process with regard to specific CDM requirements and processing of CDM projects. Although the Emission Reductions Purchase Agreement (ERPA) for the project has not yet been signed and the project has not been validated yet, the experience gained from this pilot project should be useful in the context of developing other CDM reforestation projects in Albania. Furthermore, while this project falls under the reforestation window of CDM, much of the general knowledge gained through the project preparation process should be applicable in developing CDM projects in other sectors in Albania.

GEORGIA — GAS TRANSMISSION SYSTEM REHABILITATION

(World Bank-Danish Carbon Fund, Italian Carbon Fund, Spanish Carbon Fund)

The World Bank has been working with the Georgian Oil and Gas Corporation (GOGC) since 2005 to prepare a carbon finance project under the Clean Development Mechanism (CDM) of the Kyoto Protocol. This project will reduce technical losses in Georgia's major gas transmission pipeline network, thus reducing waste of a valuable natural resource while reducing greenhouse gas emissions that contribute to climate change.

Background. Georgia's gas transmission network is nearly 2000 km long and consists of high-pressure pipe sizes ranging from 1200 mm down to 300 mm in diameter. Natural gas, of which the main constituent is methane, currently leaks into the atmosphere; technical losses were estimated at above 7.0 percent prior to the start of the project.

Gas leakage and the sources of leakage are often difficult to detect and, like many gas pipeline operators in the region and in other developing countries, the GOGC has lacked the resources and skills required to identify and repair leaks throughout the system. Significant elements of the pipeline system are located in areas that are difficult to access and subject to landslips and washouts that can damage the pipeline. Corrosive forces in some areas have led to thinning and perforation of pipe walls.



Resources that have been unavailable include the sensitive hardware and software technology needed to accurately measure the leak rate; similarly unavailable has been the ability to undertake repairs in less accessible areas. In addition, as is often the case in developing countries, GOGC, as the responsible gas transporter has been unable to raise the funds necessary to cover investment costs of rehabilitating the gas transmission network. The GOGC, in spite of their best operations and maintenance efforts with available resources and skills, has been unable to correct pipeline system leaks, which continue at ever-increasing rates.

The carbon opportunity. Proposed repairs to the transmission system and the subsequent reduction in gas leaks as well as the registration of this activity as a CDM project with the UNFCCC will lead to the generation of emission reductions. In its capacity as a trustee of a number of carbon funds, the World Bank has advanced funds and provided technical assistance to register this project at the CDM Executive Board, and is prepared to purchase emission reductions both prior- and post-registration. In the period up to 2012, GOGC estimates that it may generate emission reductions with a potential market value of over US\$120 million. In addition, the carbon asset will be certified for ten years, and thus GOGC will be able to sell emission reductions generated after 2012 under any international greenhouse gas mitigation regime.

The potential for carbon revenues has been a major incentive in the decision to implement the proposed project. This project is expected to generate approximately 24.5 million tCO_{2e} of emission reductions during 2004-13 from key points in the gas transmission infrastructure with a potential to earn over US\$200 million. While the rehabilitation project alone is financially and economically viable without carbon revenues, GOGC was effectively bankrupt in 2004 with accumulated deficit in excess of US\$19 million. Potential future carbon flows have enabled GOGC to mobilize funding from the United States Millennium Challenge Corporation (around US\$40 million) together with a credit line from the State Budget of the Government of Georgia (around US\$26 million) for the repair of the southern section of the transmission pipeline; the latter will be repaid through resulting carbon revenues. Annual carbon revenues will

contribute to critical operational and maintenance budgets to maintain the integrity of the pipeline. This carbon project has taken 14 months from PIN to ERPA negotiation.

Financial and Economic Internal Rates of Returns		
	Without ERs	With ERs
Economic Internal Rate of Return (EIRR)	158%	504%
Financial Internal Rate of Return (FIRR)	96%	198%
Net Present Value (NPV) @10% (US\$ million)	US\$219	US\$285

Methodology. Under the CDM, a “methodology” defines the procedure and equations to determine (i) baseline emissions (i.e., reference scenario); (ii) project emissions; (iii) monitoring; and (iv) the additionality of the project. A new CDM methodology has been developed for the Georgia pipeline project. It is presently rated ‘B’. Once approved by the CDM Board (i.e., the CDM regulatory body) other similar projects can use it as well.

Project benefits. Repairing the pipeline system to an acceptable standard will increase the integrity of the system and provide a more secure supply to Georgian natural gas consumers, who currently lack reliable service. The project will also improve economic development in the region. The gas loss savings will enable GOGC to sell the additional gas, thus improving the company’s financial position. Upgrading the Georgian pipeline system will allow additional transit (and revenues) to occur in this critical gas region of the world. Local businesses can take advantage of the improved reliability of natural gas supply to build additional industrial and commercial capacity.

GEORGIA – SMALL HYDRO REHABILITATION PROJECT
(World Bank – Community Development Carbon Fund)

Georgia has untapped hydropower resources that can augment the country’s electricity needs. The poor technical condition of existing mini-hydro power stations means that they are generating only a fraction of their design capacity. In addition, there are rivers with potential for new hydropower stations.

The Project. The United States Agency for International Development’s (USAID) Rural Energy Program has identified 24 potential mini-hydro project sites for rehabilitation. The identified mini-hydro power stations are owned and operated by independent power producers (IPPs) who supply the Georgia power grid and communities in their vicinity. The investment project will finance the rehabilitation of these mini-hydro power stations, increasing their capacity by at least 15 MW and possibly 23 MW after the projects are completed.

The proposed rehabilitation activities will increase current output by upgrading or replacing key components at the mini-hydro stations including: turbines, generators,

waterways, lines, transformers, controls. The planned 3-year rehabilitation program is estimated to cost US\$15.75 million.

Institutional Arrangements. The Energy Efficiency Centre (EEC) of Georgia, a non-government organization, will manage the carbon project process¹⁸ and liaise with external donors and investors. A legally binding subsidiary agreement will be signed between the IPPs and EEC authorizing the EEC to sign contracts and agreements on behalf of the IPPs.

The EEC will be responsible for the implementation of the community benefit plan linked to the provision of carbon revenues. The IPPs will have authorization agreements with the EEC, transferring the ownership of the emission from the former to the latter, thereby legally assigning their emission rights.

Project Financing and Benefits. The owners of the mini-hydro power plants are required to contribute a minimum of 5.0 percent of the rehabilitation cost estimated at US\$0.75 million. In addition, other financing will be provided by: USAID (US\$4.5 million); EBRD (US\$8.5 million, of which US\$4.5 million will be channeled through the Bank of Georgia under a Participation Agreement); and UNDP (US\$1.0 million).

Through this project, between 206,000 and 290,000 tCO_{2e} of emission reductions will be generated through the substitution of electricity supplies from fossil fuel based sources. The World Bank's Community Development Carbon Fund (CDCF) intends to purchase emission reductions through a contract with EEC that will bundle the emission reductions generated by all of the rehabilitation activities. Carbon revenues are expected to be up to US\$2.6 million.

INDONESIA—INDOCEMENT SUSTAINABLE CEMENT PRODUCTION

(World Bank - Prototype Carbon Fund, PCF)

The Sustainable Cement Production Project being implemented by Indonesia's second largest cement producer PT Indocement Tungal Prakasa Tbk (Indocement) is the PCF's first cement sector project for reducing greenhouse gas emissions.

Globally, cement production accounts for about 3-4 percent of total greenhouse gas emissions. Considerable potential exists in developing countries to reduce such emissions by adopting new technologies, processes and methods in cement production. Indocement—majority-owned by the Heidelberg Cement Group of Germany—intends to introduce a new type of cement in Indonesia, and displace coal with renewable fuels in the kilns operated by the company in three locations in Indonesia.

¹⁸ Management of the rehabilitation works will be done by USAID subcontractor Winrock international

The project objective is to reduce carbon dioxide emissions by implementing technologies and techniques not yet applied in the Indonesian cement industry. The sale of the Certified Emission Reductions (CERs) to the PCF, and possibly to other carbon buyers utilizing the Clean Development Mechanism (CDM) under Kyoto protocol, contributes to the feasibility of the project. Total greenhouse gas emission reductions over the 10-year crediting period are an estimated 10-12 million tonnes.



The project bundles two sub-projects. One sub-project aims to reduce the clinker content in cement by introducing limestone and other alternative materials such as fly-ash in the finish grinding process (blended cement). Clinker is the main ingredient in cement, which is produced by burning a mixture of raw materials, comprised mainly of limestone and clay, in large rotary kilns at temperatures above 1400 degrees Celsius. About 60 percent of the estimated emission reductions are attributed to process changes for producing blended cement. In the first phase, alternative materials up to a range of about 6-8 percent will be introduced into the final cement. Indocement plans to increase this proportion eventually to 20 percent to introduce new types of composite cements to the Indonesian market.

The second sub-project aims to reduce CO₂ emissions by using alternative fuels instead of coal, oil, and gas. Indocement aims to primarily utilize biomass such as rice husk, coconut and palm oil waste, as alternative fuels, but will also examine other wastes such as car tires and oils. Significant amounts of palm oil waste are available. Indonesia's rice production is located mainly in Java and substantial rice husk is available. The introduction of alternative fuels will progressively increase and will remain at this proportion afterwards. The expected increase of IRR is from 7.0 percent without CERs to 11.2 percent with CERs.

This carbon project took less than 15 months to move from a PIN to ERPA negotiations. A new methodology was required for this project that has taken more time to develop and have approved.

MEXICO – MEXICO CITY TRANSPORT CORRIDOR

(World Bank - Spanish Carbon Fund)

To improve bus-based services in Mexico City's Metropolitan Area (MCMA), the city government has designed and implemented a pilot corridor with exclusive bus lanes on Insurgentes Avenue.

The "Insurgentes BRT Corridor" Clean Development Mechanism (CDM) project under the Kyoto Protocol has been implemented along 19.3 of the 34 km of Insurgentes Avenue. This corridor has improved transport conditions for the 250,900 trips per day made by commuters accessing the commercial and service areas along Insurgentes and is making an important contribution to sustainable development. Further, the corridor has displaced trips from automobiles and other smaller vehicles toward large capacity fuel efficient articulated buses, resulting in important gains in energy efficiency. Finally, the operation of the corridor has resulted in a significant reduction in exposure to local criteria pollutants in the area of influence of the project. Ninety eight diesel-fuelled autobuses have replaced the original fleet of around 350 buses and minibuses. The services provided by Metrobus were used by more than one million people in the first year of operation and are expected to grow.



The project reduced about 30,000 tCO₂e emissions during its first year of operation. Although the operation of a single corridor does not produce large emission reductions, the project will enable the application of these tools and procedures on an already envisaged network of 33 corridors in the MCMA. The availability of Certified Emission Reductions (CERs) is expected to accelerate this process. The first two additional corridors are in advanced planning stages and are expected to start construction in 2007.

The crediting period selected for the project is 7 years—renewable twice for a maximum of 21 years, beginning in 2005. The CO₂ equivalent that will be reduced through this project in the first 7-year period will be around 181,000 tonnes. The project is not yet registered as a CDM project.

POLAND—WALBRZYCH COKE OVEN GAS PROJECT

(World Bank - Netherlands European Carbon Facility)

The Wałbrzych Coke Oven Gas carbon finance project is an 8.5 MW coke-oven-gas-fired power generation plant to be constructed in Wałbrzych, south-western Poland.

The Project responds to the need to diversify Poland's energy sources and will provide a possibility for excess coke-oven gas from the coke plant in Wałbrzych (up to 50 million m³ per year) to be utilized for power generation. The gas will be sold to a private project developer. The sales will result in revenues for the coking plant, and will raise the profitability of coke production.

Merkury Energia, a special purpose company for the project, has a contract with the coke plant for the supply of 45 million cubic meters of coke gas over an 8,000 hour operating period annually, which will enable the production of approximately 54 GWh of electricity every year. Allowing for station demands and transformation losses, this will allow sales of 30 GWh per year of operation to the local electric distribution company at 110 kV plus sales of 19 GWh per year directly to the coke plant.

Overall project costs are estimated at US\$6.91 million. The project will generate an estimated 260,000 tonnes of CO₂e emission reductions during the six- years from 2007 through 2012, through generation of about 54 GWh of electricity annually. The electricity generated will be sold to the grid. The carbon revenues will help finance investments in a utilization facility to discontinue flaring coke oven gas. This displaces fossil fuel based generation and contributes to the reduction of electricity generation of the grid and GHG reduction.

RUSSIA - DANILOVSK GAS FLARING REDUCTION PROJECT

(World Bank - Netherlands European Carbon Facility)

Associated gas produced in the oil fields of PLC LUKOIL is currently flared. Under this carbon finance activity, associated gas will be used in gas engines to generate electricity.

The use of this wasted energy source allows energy generation by other energy suppliers to decrease, displacing fossil fuel-based power generation and contributing to decreased emissions of local pollutants in the Tumen region and to a reduction in emissions of carbon dioxide.

The project will generate about 573,865 tCO₂e emission reductions through the generation of electricity until the end of 2012. The carbon revenues will help finance the construction of a 32.4 MWe gas fired power plant. The power plant will be fuelled by associated gas obtained during oil extraction processes that otherwise would be flared.

The fuel gas will be supplied by LUKOIL and the generated electricity will be sold to LUKOIL. Initial project costs for the power plant are estimated at Euro 25.5 million.

UKRAINE - UKRHYDROENERGO HYDROPOWER REHABILITATION PROJECT (World Bank - Netherlands European Carbon Facility)

“UkrHydroEnergo is proud to implement one of the first Joint Implementation mechanism projects in Ukraine and to pioneer the use of this new financing mechanism. The revenue from the sale of Emission Reduction Units to the World Bank Netherlands European Carbon Facility provides important added cash-flow to the project”

Semen Potashnik, UkrHydroEnergo Chairman

This hydropower rehabilitation carbon finance project involves the rehabilitation of 46 hydro units, which are located at nine different sites on the Dnipro River and one site on the Dnister River in Ukraine. Some of the oldest hydro units were commissioned 70 years ago and while the equipment will not be obsolete for many years to come, they continue to run at increasingly lower efficiency levels. Through the project, power generation equipment such as gates, turbines, generators, and control systems will be replaced.

The project will increase the electricity generation capacity and efficiency of the rehabilitated hydropower plants. Additional power generated by the hydro units during peak periods will displace generation by thermal plants. The Netherlands European Carbon Facility (NECF) has contracted to buy



emission reductions due to displaced thermal electricity generation estimated at one million tonnes of carbon dioxide equivalent between 2006 and end-2012.

An emission reductions purchase agreement was signed for one million tonnes of carbon dioxide equivalent between the project developer UkrHydroEnergy and the World Bank on behalf of the NECF in Kiev in September 2006, making this the first Joint Implementation project in the NECF's portfolio and the first project in Ukraine for the World Bank.

UZBEKISTAN: TASHKENT SOLID WASTE COMPOSTING PROJECT

(World Bank - Community Development Carbon Fund)

The Community Development Carbon Fund's Tashkent Solid Waste Composting project is being developed by Mahsustrans, the city's public solid waste company. It builds on the successful World Bank- and EBRD-financed Tashkent Solid Waste Management Project, which provided support to the city to finance solid waste collection equipment, construct three transfer stations, and upgrade utility management and landfill operations.



The objective of the proposed Tashkent Solid Waste Composting Project is to introduce solid waste composting into Tashkent's formal solid waste management to reduce methane gas production and allow the city to qualify for greenhouse gas offsets that would be paid by the World Bank Carbon Finance Program. The value of the payments will depend on the amount of methane reduced, which must be validated annually.

The proposed carbon finance project responds to the city's need to ensure the financial sustainability of its solid waste management system. The project will use a low-cost technology to implement a composting project on a 4.9 hectare site at the city's main Aghangaran landfill. Aerobic processing will convert organic municipal solid waste to a safe form with carbon dioxide rather than methane as the main gaseous emission. The compost will be used as a landfill cover.

Carbon revenues from the sale of around 728,000 tonnes of emission reductions over an 8-year period will help finance operating and capital expenditures thus reducing financial pressure on the municipal government to subsidize the solid waste company's operations. Further benefits will be provided to the city's waste pickers through the World Bank's Community Development Carbon Fund (CDCF). The CDCF is designed to purchase emission reductions from small-scale projects with environmental and social benefits, and allocates an additional payment of up to US\$1 per tonne of emission reductions. Stakeholder assessments have been conducted to ensure consensus on the community benefit plan for this project and monitoring indicators and participatory procedures have been developed.

Financial Impact (8-year horizon)

Capital Expenditure	US\$ 312,800
Annual Operating Expenditure	US\$ 157,885
Carbon Revenues (8 years) – excluding waste picker benefit	US\$ 4,369,050
Waste picker benefit	Up to US\$ 400,000
Net Present Value (without carbon revenues, discount rate 10 percent)	US\$ 46,921
NPV (with carbon revenues)	US\$ 824,179
Internal Rate of Return (without carbon revenues)	13.5 percent
Internal Rate of Return (with carbon revenues)	28.3 percent

Annex D. Risks and Price Determinants

Kyoto Regulatory Risks	
<p>Project determination, ERU issuance, and the crediting period renewal¹⁹ are the largest individual price determinants since they define the emission reduction's compliance with the eligibility criteria set up in the existing frameworks.</p> <p>Emission Reduction Units (ERUs) are assets eligible for international trade; contracts based on ERUs yield higher prices from buyers such as the World Bank Carbon Funds, vis-à-vis verified emission reductions (VERs).</p>	
Registration of the project	<p>These are risks related to project determination, including JI regulatory risks (e.g., decisions on eligibility, and additionality criteria, determination and review processes). Project-related risks associated with potential delays or challenges in issuing approval by the Designated Focal Point (DFP) are also included in project-related risks. Projects in countries without DFPs with a proven track record in issuing Letters of Approval are likely to be perceived as having high risks associated with them.</p> <p>In some circumstances the Bank is willing to purchase Verified Emission Reductions (VERs), using a draft methodology for making the relevant emission reduction calculations. In a VER transaction the World Bank would assume the risks associated with project determination and conversion of VERs into ERUs. The price offered for VERs takes into account the additional risks and is usually lower than the price paid for ERUs for similar transactions. VERs cannot be used to fulfill obligations under the Kyoto Protocol and are not tradable assets under this framework. The Bank remains one of the only purchasers of VERs in the world.</p>
Issuance of the CERs	<p>This risk includes the verification risks, including possible clarifications regarding the monitoring and ability to properly verify the achieved ERs, and potential delays regarding the issuance of the ERUs into purchasers' accounts. These risks may reduce the amount of ERUs that are generated by the project.</p>

¹⁹ Crediting renewal risk: This relates to the robustness of the project's baseline after the first period of generation of emission credits and the likelihood that the crediting period is renewed and, if so, the risk that future volumes of emission may decrease with future crediting periods. The applicable adjustment factor depends on the lengths of the contract beyond the first crediting period

Contract Structure	
Guaranteed delivery of emission reductions	<p>Whether an ERPA contract includes a seller's obligation for guaranteed delivery, and the type of guaranteed delivery it includes, greatly impacts the price for the ERUs (10-30 percent). This reflects the larger risks and liabilities legally assumed by the sellers under these contracts.</p> <p>Even among guarantee clauses significant variations exist on what portion of emission reductions are being guaranteed, and obligations from under-delivery. For example, some contracts provide for liquidated damages that require the seller to compensate the buyer in cash for any delivery shortfalls on the basis of prevailing spot prices for replacement ERUs²⁰. The World Bank ERPA contracts do not request the seller's delivery guarantee of emission reductions under normal circumstances²¹.</p>
Upfront payments	<p>If part of the ERPA contract is paid in advance, the buyer is assuming project developers' credits risk in case the project is not completed and does not deliver the emission reductions. The value of assuming such risk is a function of the riskiness of the project and any guarantees provided by the developer or other guarantor (and the guarantor creditworthiness). The price would be discounted to cover the project risk of generating emission reductions insufficient to reimburse the up-front payment. The exact price discount is calculated based on a risk-adjusted discount rate, the total amount advanced, and the proportion between the total amount of ERs purchased and the amount of ERs to be paid for up front. In some cases the World Bank is prepared to advance up to 25 percent of the ERPA contract value to the project developer. This is negotiated on a case-by-case basis.</p>
Recovery of buyer's preparation costs and expenses	<p>Under normal circumstances, the World Bank's carbon funds recover preparation costs from carbon revenues. Under contracts where the project developer wishes to accept a discount in return for not deducting the preparation cost, the price deduction is based on contracted volume and the estimated costs.</p>
Structure pricing	<p>Features such as seniority (e.g., receiving the first tonnes delivered by a project), sweeping clauses, over-collateralization and other financial covenants, affect delivery risk which should be reflected in spreads. A price increase is proposed if the features described apply.</p>

²⁰ http://carbonfinance.org/docs/StateandTrendsMarketUpdateJan1_Sept30_2006.pdf (p.11)

²¹ Except for cases of willful misconduct from the sellers on transferring the emission reductions generated by the project to the World Bank Carbon Fund under agreement.

Contract Structure	
Purchases beyond 2012	The current regulatory period ends at 2012—the first commitment period of the Kyoto Protocol, therefore demand to purchase beyond 2012 is minimal. Indeed, the Bank is among the very few buyers of emission reductions generated and delivered after 2012. In deciding to adopt discount prices post-2012, the options are to write contracts for two prices (pre and post-2012) or to develop weighted average all-in price based on estimated purchase after 2012.

Project Risks
<p>The risk of the underlying project and the likelihood that the project will be constructed on time and will remain fully operational during the contract period. Project-related risks also include potential delays or challenges in obtaining licenses and permits.</p> <p>Projects in countries without DFPs or a proven track record in issuing Letters of Approval are likely to be perceived as high risk.</p>